

Pennsylvania Public School Employees' Retirement System

June 30, 2018 Valuation
Board Presentation
December 7, 2018

BUCK

Disclosures

The information contained herein is developed for the Board of Trustees and Staff of the Pennsylvania Public School Employees' Retirement System (PSERS) by Buck Global, LLC (Buck) using actuarial principles and techniques in accordance with all applicable Actuarial Standards of Practice (ASOPs). This document provides key results of the June 30, 2018 actuarial valuation. Interested parties may refer to the full June 30, 2018 Actuary's Report, which is scheduled to be released in January 2019, for a detailed explanation regarding data, assumptions, methods, and plan provisions that underlie the valuation results. In the interim, interested parties may refer to the full Actuary's Report on the June 30, 2017 actuarial valuation for a detailed explanation regarding assumptions, methods and plan provisions that underlie the valuation.

The material contained herein is based on census and financial data, actuarial assumptions and methods, and plan provisions applicable to the June 30, 2018 actuarial valuation of PSERS. Where presented, historical information is based on the parameters of the corresponding actuarial valuation. No third party recipient of Buck's work product should rely upon Buck's work product absent involvement of Buck or without our approval.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. An analysis of the potential range of future results is beyond the scope of this valuation.

Where presented, references to "funded ratio" and "unfunded accrued liability" are to measurements made on the basis of the actuarial value of assets. It should be noted that the same measurements made using the market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratios presented are appropriate for evaluating the need for and level of future contributions but provide no indication of the funded status of the plan if the plan were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities.

David L. Driscoll is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. Edward Quinn and Salvador Nakar are Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. We are available to answer any questions on the material contained herein, or to provide explanations or further details as may be appropriate.

Agenda

- Overview of 2017 - 2018 fiscal year
- Report on June 30, 2018 valuation results

Overview of 2017/2018 Fiscal Year

- The time-weighted rate of return on the market value of assets was 9.27% (*per Aon*)
 - Expected return for the period July 1, 2017 to June 30, 2018 was 7.25%.
 - Due to the asset smoothing method approach in use for determining the Actuarial Value of Assets (AVA), the AVA rate of return for the year was approximately 3.83%, which reflects continued recognition of past asset losses.
 - This valuation is the last year the asset loss from 2008/2009 (Great Recession) is being recognized.
- The proportion of eligible participants who are assumed to elect Premium Assistance coverage remained at 63% for determination of the Premium Assistance contribution rate.
- The proportion of anticipated 2019/2020 fiscal year new System member elections under Act 5*:
 - 65% elect Class T-G membership,
 - 30% elect Class T-H membership and
 - 5% elect DC-only membership

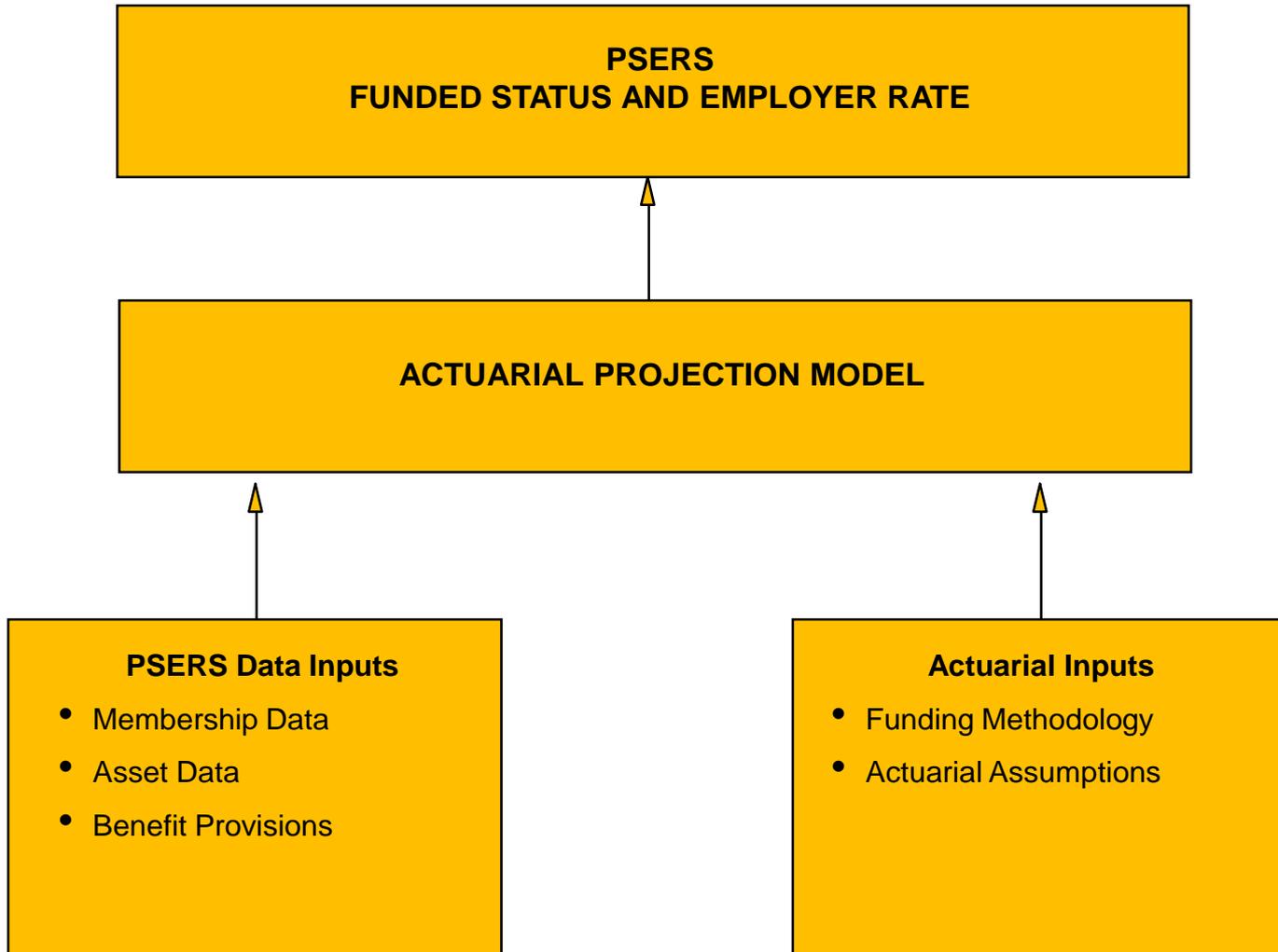
* These are the assumptions used in the development of the cost note for the passage of Act 5.

Results of Actuarial Valuation

- Employer contribution rate
 - The fiscal year 2019/2020 actuarially required employer contribution rate is 34.29%
 - 33.36% Pension plus
 - 0.84% Premium Assistance plus
 - 0.09% Act 5 DC contribution
 - The Act 120 minimum employer pension rate is the normal cost rate of 7.49%
 - The fiscal year 2018/2019 actuarially required employer contribution rate is 33.43%
 - 32.60% Pension plus
 - 0.83% Premium Assistance

Results of Actuarial Valuation

- Security of promised benefits
 - Accrued liability exceeds actuarial value of assets by \$44.9 billion
 - Funded status based on the System's actuarial value of assets is 56.5%
 - Funded status as of June 30, 2017 based on the System's actuarial value of assets was 56.3%
 - The above funded ratios have no relationship to the possible funded position on a settlement-of-liabilities basis
- Net actuarial (gain) or loss
 - Comparison of actual experience to expected
 - Experience loss for fiscal year ended June 30, 2018 is \$0.349 billion
 - Actuarial asset loss of \$1.939 billion
 - Actuarial liability gain of (\$1.590) billion
 - The fiscal year 2018 actuarially required employer contribution rate was made. There was no actuarial experience due to (over)/under-contribution.



Active Membership Statistics

<u>Item</u>	<u>June 2018</u>	<u>June 2017</u>
Class T - C	3,216	3,447
Class T - D	175,975	184,831
Class T - E	63,880	56,453
Class T - F	<u>13,291</u>	<u>11,214</u>
Total Number	256,362	255,945
	+0.16 %	
Annualized salaries (Total salaries)	\$ 13.379 Bil +2.65 %	\$ 13.034 Bil
Average compensation	\$ 52,188 +2.48 %	\$ 50,924
Average age	45.3 Yrs.	45.2 Yrs.
Average service	11.5 Yrs.	11.4 Yrs.
Funding year	2019-2020	2018-2019
Total employer payroll (est.)	\$ 13.880 Billion	\$ 13.775 Billion

Annuitant Membership Statistics

<u>Item</u>	<u>June 2018</u>	<u>June 2017</u>
Number		
Annuitants	212,712	209,715
Survivors and beneficiaries*	11,409	11,128
Disabled annuitants	<u>9,167</u>	<u>9,171</u>
Total	233,288	230,014
	+1.42 %	
Annual annuities		
Annuitants	\$ 5.579 Bil	\$ 5.479 Bil
Survivors and beneficiaries	0.164 Bil	0.156 Bil
Disabled annuitants	<u>0.184 Bil</u>	<u>0.181 Bil</u>
Total	\$ 5.927 Bil	\$ 5.816 Bil
	+1.91 %	
Average annuities		
Annuitants	\$ 26,225	\$ 26,128
Survivors and beneficiaries	\$ 14,406	\$ 14,019
Disabled annuitants	\$ 20,607	\$ 19,740
Total	\$ 25,405	\$ 25,287
	+0.47 %	

* Excludes 1,752 beneficiaries in 2018 and 2,141 beneficiaries in 2017 who are only entitled to a lump sum distribution.

Market Value of Assets

<u>Item</u>	<u>June 2018</u>	<u>June 2017</u>
Beginning of year	\$ 53.199 * Bil	\$ 49.957 Bil
Contributions	5.388	4.958
Benefits	(6.767)	(6.584)
Investment income	<u>4.666</u>	<u>4.948</u>
End of year	\$ 56.486 Bil	\$ 53.279 Bil
Rate of return	9.27 % (per Aon)	10.14 % (per Aon)
Expected rate of return**	7.25 %	7.25 %

* Beginning of the year assets adjusted by (\$.08) bil for accounting adjustment

** Based on prior year's valuation interest rate

Actuarial Value of Assets

Ten-year asset smoothing method

1. Market value of assets June 30, 2018 \$ 56.486 Bil
2. Determination of deferred gain (loss)

Fiscal Year	Gain (Loss)	Recognized Amount – FY17/18	Percent Deferred	Deferred Amount
2017/2018	\$ 0.551 Bil	\$ 0.055 Bil	90.00 %	\$ 0.496 Bil
2016/2017	0.847	0.085	80.00	0.677
2015/2016	(3.794)	(0.379)	70.00	(2.656)
2014/2015	(2.918)	(0.292)	60.00	(1.751)
2013/2014	2.864	0.286	50.00	1.432
2012/2013	(0.153)	(0.015)	40.00	(0.061)
2011/2012	(3.246)	(0.325)	30.00	(0.974)
2010/2011	4.598	0.460	20.00	0.920
2009/2010	1.449	0.145	10.00	0.145
2008/2009	<u>(21.138)</u>	<u>(1.879)</u>	0.00	<u>0.000</u>
	\$ (20.940) Bil	\$ (1.859) Bil		\$ (1.772) Bil

3. Preliminary actuarial value of assets June 30, 2018: (1) – (2) \$ 58.258 Bil

Actuarial Value of Assets

Ten-year asset smoothing method

- Per Act 5 of 2017, the Actuarial Value of Assets must be in a 30% range of the Market Value of Assets:
 1. Preliminary Actuarial Value of Assets = \$58.258 Billion
 2. 70% of the Market Value of Assets = $.70 \times \$56.486 \text{ Billion} = \39.540 Billion
 3. 130% of the Market Value of Assets = $1.30 \times \$56.486 \text{ Billion} = \73.432 Billion
 4. Actuarial Value of Assets = (1) not less than (2) nor greater than (3) = \$58.258 Billion

Notes:

- The 30% corridor limits how far the 10-year asset smoothing method can depart from market value of assets.
- The corridor will (decrease)/increase the unfunded accrued liability contribution rate if the actuarial value of assets is (less than 70%)/greater than 130% of the market value of assets.

Actuarial Cost Method

- PSERS Cost Method
 - Entry Age Normal
 - Required by Code
- Entry age normal method: allocation of reserve over members' working lifetimes
 - Pension benefit earned during year (normal cost)
 - Payment toward unfunded accrued liability
- Goal: full reserve at retirement

Accrued Liability

	<u>June 2018</u>	<u>June 2017</u>
Annuitants and Inactives	\$ 58.835 Billion	\$ 58.129 Billion
Active members	<u>44.156</u>	<u>43.720</u>
Accrued Liability Pension	\$ 102.991	\$ 101.849
Health care payments	<u>0.123</u>	<u>0.124</u>
Total Accrued liability	\$ 103.114 Billion	\$ 101.973 Billion

Unfunded Accrued Liability and Funded Status

<u>Item</u>	<u>June 2018</u>	<u>June 2017</u>
Accrued Liability Pension	\$102.991 Bil	\$101.849 Bil
Healthcare Payments	<u>0.123</u>	<u>0.124</u>
Total Accrued liability	\$103.114 Bil	\$101.973 Bil
<u>Assets</u>		
Market value of assets	\$56.486 Bil	\$53.279 Bil
Actuarial value of assets	\$58.258 Bil	\$57.461 Bil
<u>Unfunded accrued liability</u>		
Market value of assets*	\$46,628 Bil	\$48.694 Bil
Actuarial value of assets**	\$44.856 Bil	\$44.512 Bil
<u>Funded status</u>		
Market value of assets	54.8%	52.2%
Actuarial value of assets	56.5%	56.3%

* Similar to GASB 67 Net Pension Liability.

** Act 120 amortization is over a period of 24 years with amounts increasing as a level percent of compensation.

Employer Contribution Rate

<u>Item</u>	<u>June 2018 (FY19/20)</u>	<u>June 2017 (FY18/19)</u>
Normal cost rate	15.08%	15.16%
Member rate (average)	<u>(7.59)</u>	<u>(7.57)</u>
Employer normal cost rate	7.49%	7.59%
Unfunded accrued liability rate	<u>25.87</u>	<u>25.01</u>
Preliminary pension rate	33.36%	32.60%
Act 120 minimum pension rate (employer normal cost rate)	7.49%	7.59%
Final pension rate	33.36%	32.60%
Health insurance rate	0.84	0.83
Act 5 DC contribution rate	<u>0.09</u>	<u>N/A</u>
Total	34.29%	33.43%

Note: The total employer contribution rate is the sum of the pension rate, health insurance rate and Act 5 DC contribution rate.

Funding Methodology

Goal - Full Reserve at Retirement

Benefit	Annual Cost	Rate Component
Projected Retirement Benefit	Level % Pay	Normal Cost Rate
Accrued Benefit:		
(1) Unfunded accrued liability as of the June 30, 2010 valuation	24-Year Amortization Level % Pay	Accrued Liability Rate
(2) Legislation which increase liability (e.g. COLAs or ERI windows)	10-Year Amortization Level % Pay	Supplemental Liability Rate
(3) Annual Actuarial Gains/Losses and Assumption Changes	24-Year Amortization Level % Pay	Experience Adjustment Factor

Unfunded Accrued Liability Rate

<u>Rate Component</u>	<u>June 2018 (FY19/20)</u>	<u>June 2017 (FY18/19)</u>
Accrued liability rate	11.04%	10.75%
Supplemental liability rate	0.00	0.00
Experience adjustment factor	<u>14.83</u>	<u>14.26</u>
Unfunded accrued liability rate	25.87%	25.01%

2018 Net Actuarial Loss

1. Investment return loss ¹	\$ 1,939 Mil ²
2. Experience (gains) and losses	
- New entrants and pickups	273
- Individual salary increases	(547)
- Mortality	(47)
- Terminations (retirement/disability/terminations)	(121)
- Data – active expected future service update	(977)
- Miscellaneous	<u>(171)</u>
- Total	\$ (1,590) Mil
3. Net actuarial experience loss: (1) + (2)	\$ 349 Mil

¹ 3.83% actuarial rate of return vs. 7.25% expected. Actuarial rate of return based on 10-year averaging of (gains)/losses.

² Includes \$1,859 Mil investment return loss plus \$80 Mil loss due to accounting adjustment

Health Insurance Account 2019/2020 Employer Rate

Estimated number of eligible annuitants in FY 2020/2021	154,800
Estimated number of eligible annuitants who elect coverage	97,524
1. Estimated balance at 6/30/2019	\$ 121.0 Mil
2. Disbursements FY 2019/2020	\$ 117.6
3. Disbursements FY 2020/2021	\$ 119.1
4. Required contribution: (2) + (3) – (1)	\$ 115.7
5. FY 2019/2020 membership payroll	\$ 13,880 Mil
6. Health insurance employer rate: (4) ÷ (5) (rounded up)	0.84%

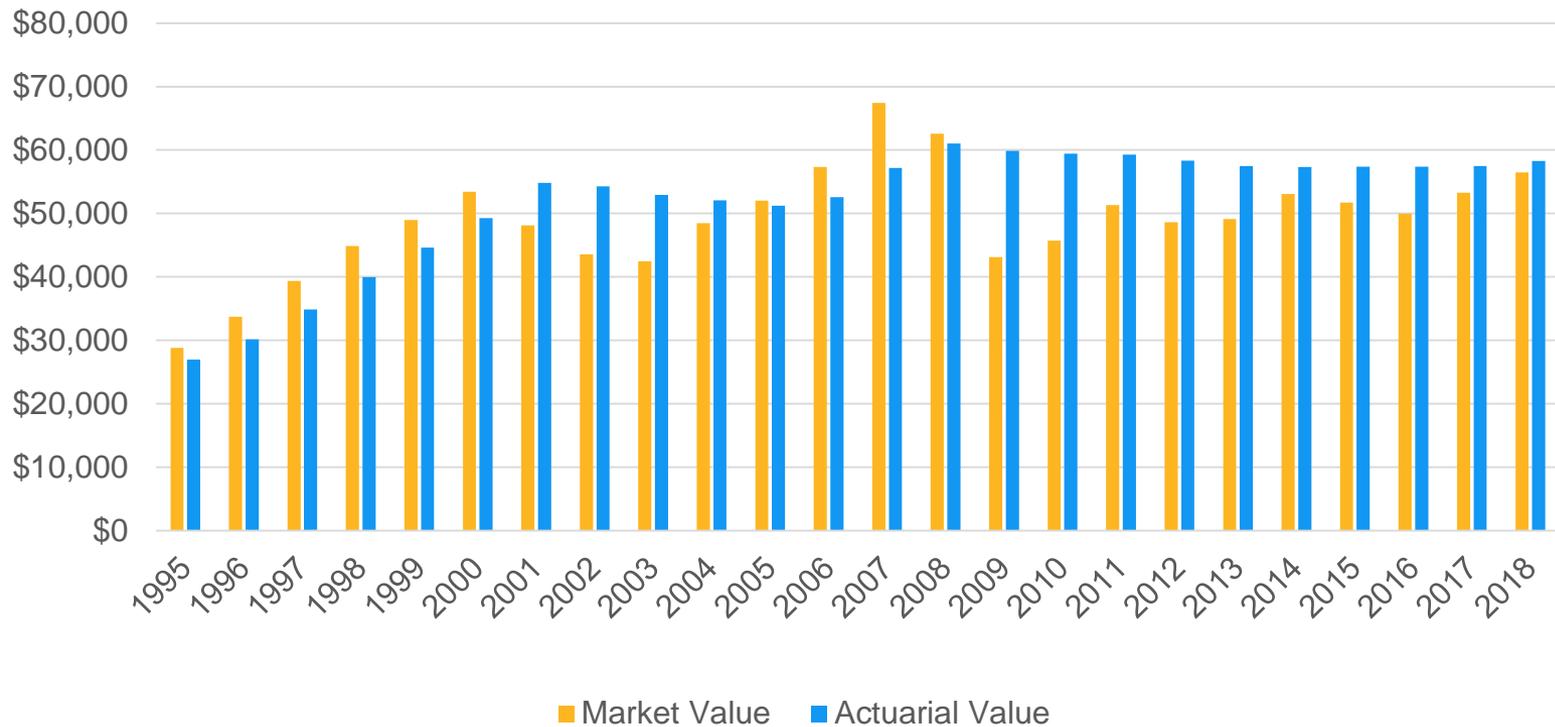
Notes:

63% of eligible annuitants are assumed to elect coverage. This is the same assumption used in the prior valuation.

Actuarial Accrued Liability disclosed under GASB 74 as of June 30, 2018 is \$2,208 million, based on a discount rate of 2.98%.

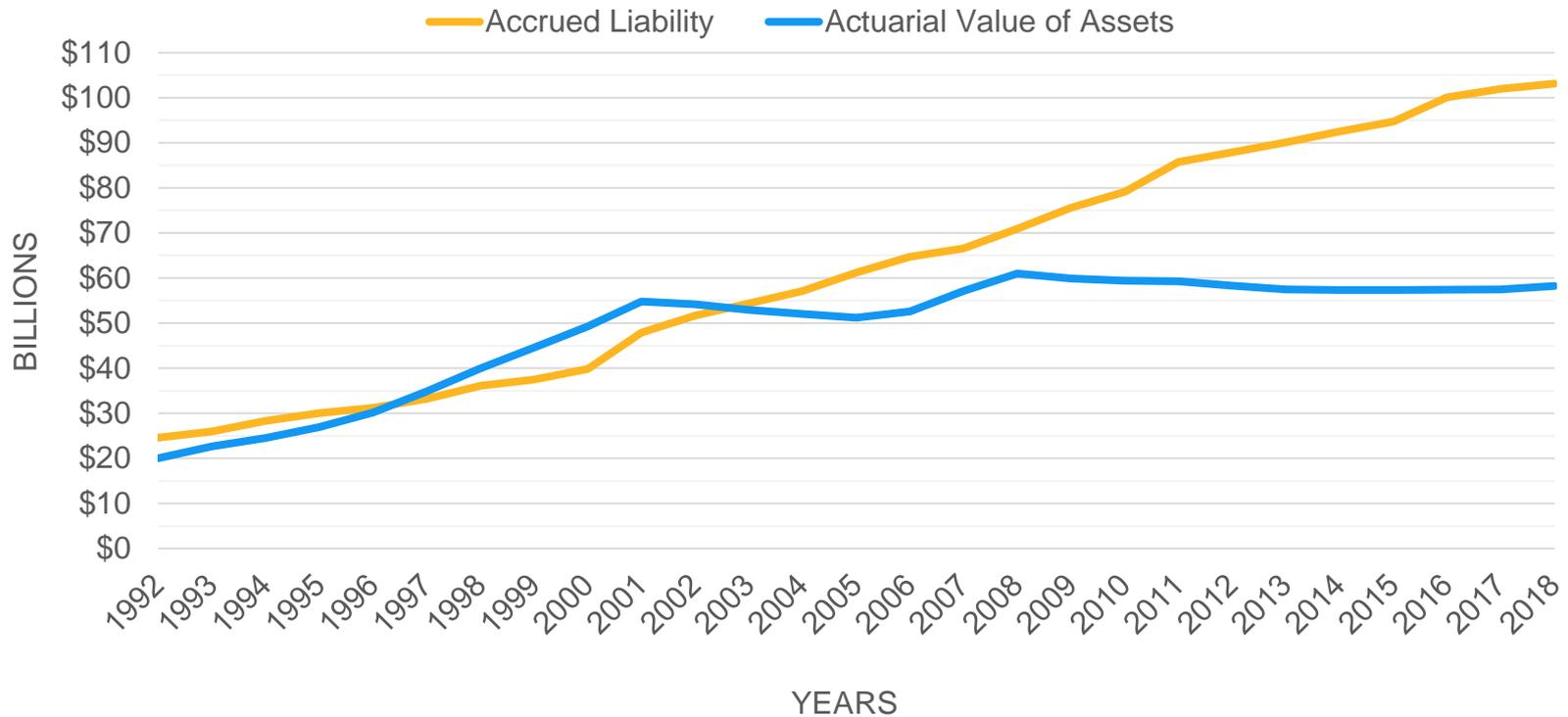
Appendices

Comparison of Asset Values (\$ Millions)



Note: Beginning with the 2010 valuation, the actuarial value of assets reflects the 10-year asset smoothing method enacted by Act 120.

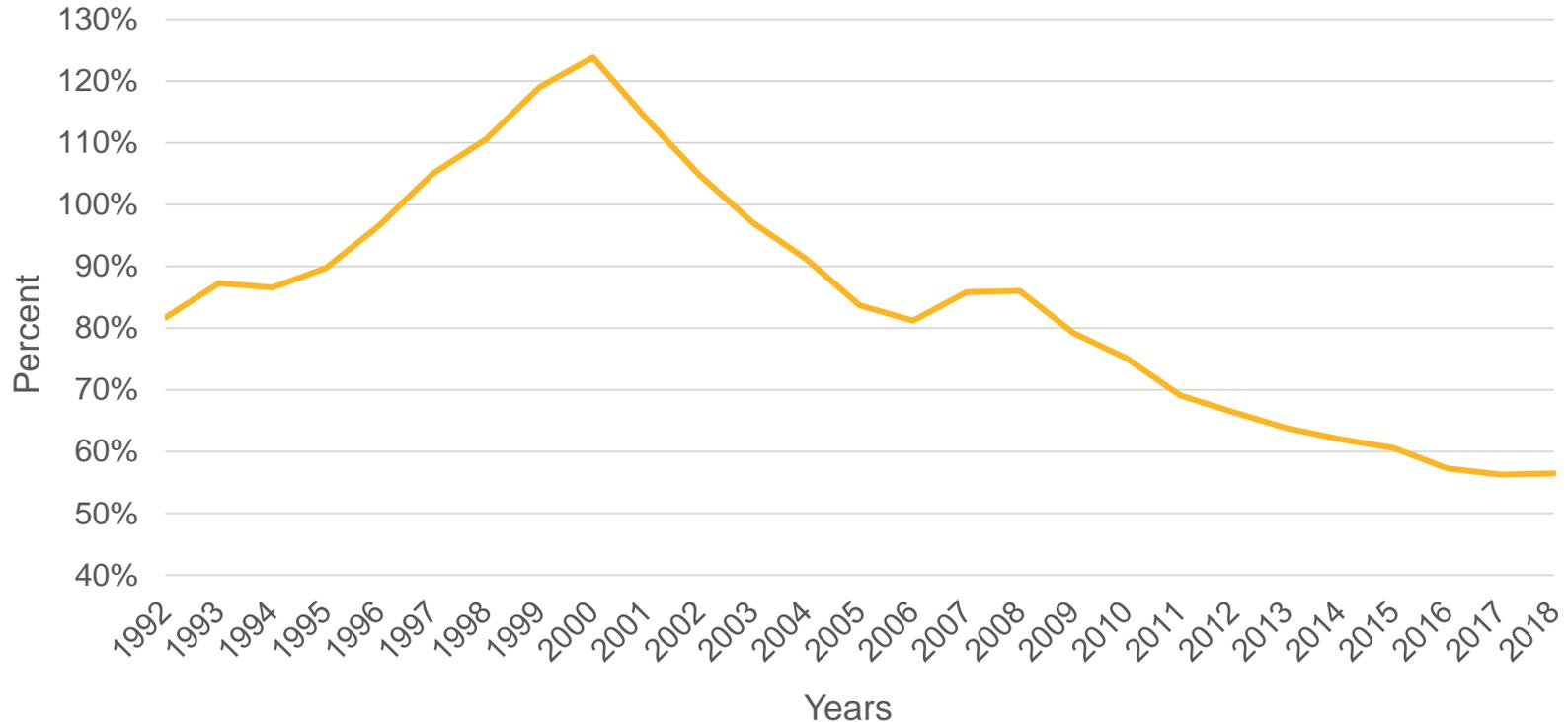
Accrued Liability and Actuarial Value of Assets: 1992 - 2018



Note: Beginning with the 2010 valuation, the actuarial value of assets reflects the 10-year asset smoothing method enacted by Act 120.

Financial Position Funded Status

Actuarial Value of Assets as a % of Accrued Liability: 1992 - 2018



Note: Beginning with the 2010 valuation, the actuarial value of assets reflects the 10-year asset smoothing method enacted by Act 120.

Total Contribution Rate

Fiscal Year	Normal Cost	Unfunded Accrued Liability	Health Care Contribution	DC Contribution (Average) ⁴	Total Employer	Member Contribution (Average) ¹	Total Contribution Rate
19/20	7.49%	25.87%	.84%	.09%	34.29%	7.59%	41.88%
18/19	7.59	25.01	.83	N/A	33.43	7.57	41.00
17/18	7.70	24.04	.83	N/A	32.57	7.54	40.11
16/17	8.31	20.89	.83	N/A	30.03	7.52	37.55
15/16	8.38	19.44	.84	N/A	25.84 ²	7.49	33.33
14/15	8.46	17.51	.90	N/A	21.40 ²	7.46	28.86
13/14	8.57	15.25	.93	N/A	16.93 ²	7.43	24.36
12/13	8.66	12.99	.86	N/A	12.36 ²	7.40	19.76
11/12	8.12	10.15	.65	N/A	8.65 ²	7.37	16.02
10/11	8.08	(0.50)	.64	N/A	5.64 ³	7.34	12.98
09/10	7.35	(3.72)	.78	N/A	4.78	7.32	12.10
08/09	6.68	(3.37)	.76	N/A	4.76	7.29	12.05
07/08	6.68	(.24)	.69	N/A	7.13	7.25	14.38
06/07	6.62	(.95)	.74	N/A	6.46	7.21	13.67
05/06	7.61	(4.28)	.69	N/A	4.69	7.16	11.85
04/05	7.48	(7.10)	.23	N/A	4.23	7.12	11.35
03/04	7.25	(4.27)	.79	N/A	3.77	7.08	10.85
02/03	7.20	(10.03)	.97	N/A	1.15	7.10	8.25
01/02	5.63	(6.05)	1.09	N/A	1.09	6.43	7.52
00/01	6.29	(4.65)	.30	N/A	1.94	5.77	7.71
99/00	6.40	(2.04)	.25	N/A	4.61	5.72	10.33
98/99	6.33	(.44)	.15	N/A	6.04	5.69	11.73
97/98	6.44	2.17	.15	N/A	8.76	5.65	14.41

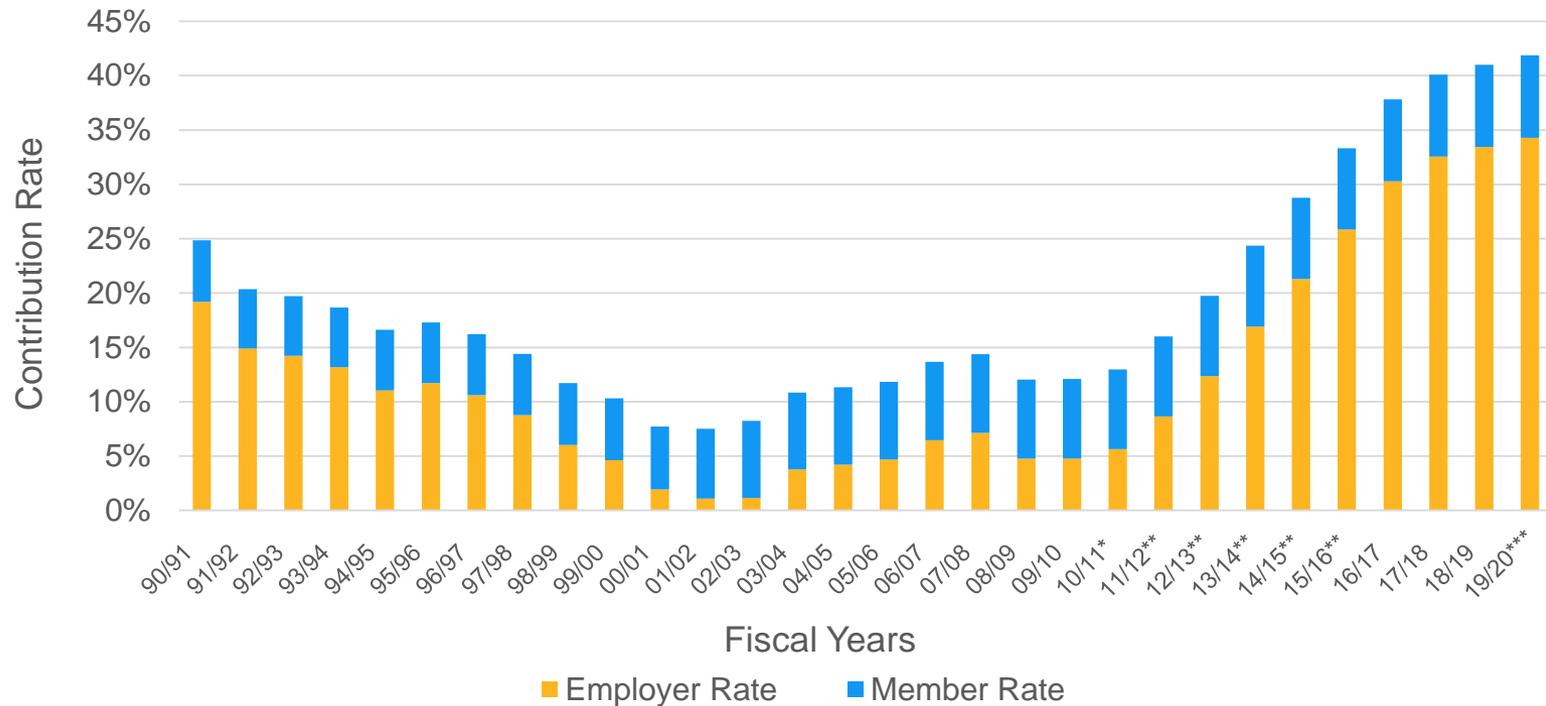
1. Act 9 member rate change took effect January 1, 2002. Act 120 member rate change took effect July 1, 2011.

2. Act 120 limited the employer pension contribution of 27.82% to 25.00% for Fiscal Year 15/16 (prior rate of 20.50% + 4.50% collar), 25.97% to 20.50% for Fiscal Year 14/15 (prior rate of 16.00% + 4.50% collar), 23.82% to 16.00% for Fiscal Year 13/14 (prior rate of 11.50% + 4.50% collar), 21.65% to 11.50% for Fiscal Year 12/13 (prior rate of 8.00% + 3.50% collar) and 18.27% to 8.00% for Fiscal Year 11/12 (prior rate of 5.00% + 3.00% collar).

3. Act 46 reduced the employer pension contribution from 7.58% to 5.00% for Fiscal Year 10/11.

4. Under Act 5, employers contribute 2.25% of pay for Class T-G members, 2.00% of pay for Class T-H members and 2.00% of pay for DC-only participants to the DC plan.

30-Year History of Member and Employer Contribution Rates



Notes:

* Act 46 reduced the employer pension contribution from 7.58% to 5.00% for Fiscal Year 10/11.

** Act 120 limited the employer pension contribution of 27.82% to 25.00% for Fiscal Year 15/16 (prior rate of 20.50% + 4.50 collar), 25.97% to 20.50% for Fiscal Year 14/15 (prior rate of 16.00% + 4.50% collar), 23.82% to 16.00% for Fiscal Year 13/14 (prior rate of 11.50% + 4.50% collar), 21.65% to 11.50% for Fiscal Year 12/13 (prior rate of 8.00% + 3.50% collar) and 18.27% to 8.00% for Fiscal Year 11/12 (prior rate of 5.00% + 3.00% collar).

*** Fiscal Year 2019/2020 includes the anticipated Act 5 DC contribution based on the following new System Act 5 membership election: 65% elect Class T-G membership, 30% elect Class T-H membership and 5% elect DC-only participation.

